REMARKS

The Office Action was mailed in the present case on July 6, 2005, making a response due on or before October 6, 2005. This response is being submitted, along with a Petition For Extension of Time Within the First Month, and the required extension fee. No additional fee is thought to be due at this time. If any additional fee is due, please charge the same to Applicant's Deposit Account No. 50-2555 (Whitaker, Chalk, Swindle & Sawyer, LLP).

I. The Invention:

The present invention deals generally with the field of "dual wall" drill pipe. Dual wall pipe offers a number of advantages in certain types of drilling applications which are not available with single wall drill pipe. With traditional single wall pipe, the circulation is accomplished by pumping the drilling fluid through the interior of the drill pipe to the drill bit and by returning the used fluid and cuttings up the well annulus to the well surface. There are disadvantages to exposing the well annulus to the cutting carrying fluids in this way, one notable disadvantage being that the hole being drilled can become plugged. A dual wall pipe has the advantage of isolating the cutting carrying fluid from the well annulus, thereby offering less chance of plugging, lessening the chances of forming unwanted fractures, and being generally more environmentally friendly.

While dual wall drill pipe has existed in the past which allowed "reverse circulation" or "dual circulation", the designs were a rigid pipe-within-a-pipe style. The relatively stiff inner pipes utilized tended to make the drill string inflexible and therefore stiff and difficult to steer and bend in the borehole. As a result, the prior art dual wall drill pipes have tended to have limited applicability in the field of directional drilling, being generally limited to relatively straight hole applications.

Applicant's invention is an improved dual wall drill string which is not as stiff as the prior art designs and which therefore facilitates reverse circulation, horizontal directional and deviated vertical drilling. The new design is capable of conveying larger-sized cuttings due to the relatively open bore and generally constant diameter of the inner tube. The unique construction of the inner tube of the assembly also provides an ideal medium for locating electrical/communication wiring which allows, e.g., information to be transmitted from the bit uphole to the well surface. The design is relatively simple to implement and relatively inexpensive to produce. There are other advantages as well.

II. The Double Patenting Rejection:

The Examiner has initially rejected Applicant's Claims 1 and 5 under the judicially created doctrine of "double patenting", based upon Applicant's own co-pending application serial number 10/972,885. Applicant is submitting a Terminal Disclaimer in accordance with 37 C.F.R. §1.321© in order to moot this grounds of rejection. The fee for filing the Terminal Disclaimer is also enclosed.

III. The Substantive Claim Rejections:

A. The Rejection of Claims 1,2,4 and 11-15 Based Upon The Combination of Garrett and Martin:

In Paragraph 5 of the Office Action, the Examiner initially rejected Applicant's Claims 1, 2, 4 and 11-15 under 35 U.S.C.§103(a) as being "obvious" over the combination of references to Garrett et al. and Martin et al. In Paragraph 6 of the Office Action, the Examiner likewise rejected Applicant's Claims 1-4, 11, 15, 17 and 18 under 35 U.S.C.§103(a) as being "obvious" over the combination of references to Willis, Martin et al. and Chapman.

The above two grounds of rejection relate to the main independent claims pending in the case and thus the main points of Applicant's invention. Many of the arguments made with respect to the first combination of references will also apply to the second combination of references. Applicant will first address the combination of Garrett and Martin. The remaining claim rejections in Paragraphs 7-11 of the Office Action all deal with secondary features of the claimed invention and will be addressed later in the response.

Turning first to the combination of Garrett et al. and Martin et al., the Examiner basically argues that Garret shows the basic features of the invention with the exception that Garrett's inner tube is not a "flexible, substantially non-metallic pipe" as claimed by Applicant. The Examiner argues that Garrett shows an outer metallic tube and an inner tube which would allow reverse circulation. The Examiner also cites Garrett as having a centering element between the inner and outer pipes. Martin is then cited by the Examiner to show a drill pipe which has an outer tubular and an inner tubular which is "made of a flexible, substantially non-metallic material."

While Applicant believes that the independent claims as initially submitted distinguish this combination of references, each of independent Claims 1 and 17 have been amended to add certain explicit language to further distinguish the combination of Garrett and Martin. The language added by amendment is intended to emphasize two key aspects of Applicant's design in addition to the fact that Applicant's inner tube is made of a "flexible, substantially non-metallic material" which allows bending of the drill pipe string, thereby facilitating horizontal directional and deviated vertical drilling. The two key aspects concern the facts that (1) dual flow or reverse circulation is allowed by the design; and (2) the inner tube in Applicant's design is of relatively constant internal diameter and thus presents a relatively open bore with little restriction in fluid flow.

Garrett is basically a traditional dual wall drill string of the type in existence for many years before Applicant's invention. However, as pointed out in the Background discussion of the present application, such dual wall drill strings having relatively rigid inner tubulars or pipes would not accomplish the intent of Applicant's invention. While they might allow reverse circulation, they were too stiff or rigid to be useful in drilling horizontal or deviated vertical well bores of the type which are becoming increasingly popular at the present time in the industry. It is well appreciated by those skilled in the drilling arts that connection failures occur when the design approaches a single unit rigid design and that design is being used to drill a deviated well bore. Nevertheless, most of the designs present in the industry today continue to utilize inner tube rigid materials that increase the outer tube connection stresses to a degree that it is favorable to limit the bending of the drill string to a point that it is still considered as a drilled straight hole. After a period of time approaching one hundred years, the drilling industry has failed to develop a design for a flexible drill string that will not induce high stresses into the outer tubular connection. If the outer tubular fails, basically speaking, the entire drill string can be in jeopardy. Those trained in the art, therefore, will advise an operator using the existing designs to be extremely cautious when drilling any sort of deviated hole.

Simply stated, the Garrett reference represents the prior art design toward which the improvement of Applicant's invention is directed, namely to provide a dual flow drill pipe which is also relatively flexible enough to allow the drilling of even highly deviated well bores.

The objects of the Garrett reference differ from those of Applicant's invention. The Garret reference is primarily a reverse circulation drill pipe that secondarily can be used as a standard drill pipe if the inner tube is removed. The telescoping inner tubes are held in by a unique spring arrangement so that they can easily be removed. The inner tubes can vary in length to accommodate conventional

drill pipe which oftentimes vary in length. Being in the nature of a conventional drill pipe, Garrett has a very small diameter on the two opposing ends, i.e., the tool joint ends. These types of pipes would be undesirable for Applicant's use, because the inner tube would be considerably larger than the conventional drill pipe.

The Examiner then combines Martin with Garrett in an attempt to provide the "flexible, substantially non-metallic inner tubular" feature of Applicant's independent claims. However, as will be apparent from the arguments which follow, Martin does not provide a "tube-within-a-tube", as in Applicant's design, but rather a "hose-within-a-tube." Note the description of Martin's inner member 18 Col. 6, lines47-49:

> *"A hydraulic hose assembly 18 is secured between the ends, 14 and 16 and runs within the interior of the pipe section 12. The ends 14 and 16, and pipe section 12, are designed to transmit the forces, including torque, necessary for the drill bit to perform its function."*

Martin uses an internal "hose" which runs between traditional "tool joint" type end connections. Applicant has amended each of independent Claims 1 and 17 to emphasize the "tube-within-a-tube" nature of Applicant's design, as opposed to the hose design of Martin. Claim 1 now describes the inner tube as having "an inner tube second end opposite the inner tube first end which defines a tube length therebetween" and as having "an inner tube diameter which is generally constant along the tube length from the inner tube first end to the inner tube second end." The diameter is indicated as 43 in Figure 2 of Applicant's drawings. In other words, Applicant's inner member is a cylindrical tubular with a relatively constant inner diameter which forms very little flow restriction as compared to the hose design of Martin. The Martin design has such things as connecting nipples and the like which give it a variable internal diameter over various portions of its length.

There are a number of reasons why such a design might work for Martin's application, but would be totally unsuitable for Applicant's intended purpose. The purpose of the Martin teaching is to speed up the velocity and lower the volume of drilling fluids with the fluids being passed through the inner tube to the bit and the cuttings being returned between the outside of the outer tube and the hole being drilled. The drilling operation basically is unchanged from conventional drilling. The only difference is that Martin teaches by limiting the inner tube's inside diameter, the amount of drilling fluid used will be minimized, therefore saving money on drilling fluid cost.

Normally the function of drilling fluids is to carry drill cuttings back to the well surface so that the cuttings will not impair the drilling operation or cause the pipe to stick or bind in the hole. Also, one skilled in the art knows that it is fluid volume, not velocity, that is really needed to get the cuttings out of the hole successfully. Velocity may be harmful environmentally, because it may wash out the hole and cause the well to frac out. In normal drilling operations, the outside annulus between the outer pipe and the drilled hole has a cross sectional area which is greater than the area of the inner tube's inside diameter, especially if the inside diameter has a restriction as taught in the Martin patent. Even though fluid flowing through the Martin inner tube has a relatively high velocity on the inside, upon returning the cuttings through the annulus it will be much slower than if the restriction was removed. As a result, the Martin type design might actually be more likely to result in the drill pipe getting stuck in the hole than if a conventional drill pipe were used, especially in the longer drilled holes where the cuttings tend to pile up in the annulus.

The nonmetallic or metallic inner tube that Martin teaches is used as a restrictor to prevent high volumes of fluids from the drilling machine to the bit. There are no teachings of the consequences of the returns coming back or where they go. The second feature of Applicant's design, which is emphasized in the amended claims, deals with the fact that Applicant's design allows "dual flow" described in the language "wherein the annular channel is adapted to convey drilling fluid under pressure toward the inner tube first end, and the inner tube is adapted to convey cuttings toward the inner tube second end" (apparatus Claim 1). This dual flow feature is described in greater detail in Applicant's method Claim 17 as "drilling a subsurface borehole by circulating drilling fluid down the annular channel which is formed between the inner tube and the outer tube and by then returning cuttings up the inner tube diameter to the surface." The Martin design would not work in this fashion for the reasons previously advanced.

Applicant's inner tube sees the return of the drill cuttings, whereas Martin teaches the opposite direction of flow through the inner tube (drilling fluid only). The function of the Martin inner tube is therefore opposite that of Applicant's inner tube and the goals of the inner tubes are entirely different. Stated in another way, the inner tube of Martin will not work or function in the type of reverse circulation application described in Applicant's amended claims. The Martin inner tube diameter would be of such a small relative diameter that it would likely not pass cuttings and would therefore clog up and disrupt the drilling operation. The Martin tube is purposely designed to be small for high velocities. Applicant's inner tube is purposely designed to have a relatively constant internal diameter which presents the lowest possible velocity which will still carry the cuttings through the inner tube.

B. The Rejection of Claims 1-4, 11, 15, 17 and 18 Based Upon The Combination of Willis, Martin and Chapman:

The second basis of rejection is the combination of Willis with Martin and Chapman which the Examiner has used to reject Applicant's Claims 1-4, 11, 15, 17 and 18. The Willis reference is directed to the problem of differential rotation of the inner tube to the outer tube, which causes wear and failure to both of the tubes in use. Willis attempts to anchor the inner tube to the outer tube using heat meltable adhesive with centering lugs, etc. This dual wall drill pipe would again not drill a highly deviated bore hole without likely failure. The Examiner makes the same type argument regarding the teaching of Willis as was made with respect to Garrett earlier, also noting that Willis fails to teach a flexible, non-metallic inner tubular. Martin is again cited to make up this deficiency. The Chapman reference is added to show a reverse circulation fluid flow. For the same reasons previously advanced with respect to the Garrett reference, however, the combination of the inner tube material of Martin with Willis's outer pipe would not accomplish Applicant's intended function of reverse circulation because, first and foremost, the Martin inner tubular has such a relatively small internal diameter.

Another problem with the Examiner's suggested combination is the fact that the Martin inner hose would also likely have to be made abrasion resistant if it were intended to carry cuttings. As Martin teaches, the ends of the inner tube must be addressed because they will be destroyed if they are not protected. Applicant's design has the more abrasive or hostile materials passing through the inner tube. This would likely not work with the Martin design, unless it were drastically modified. In other words, not only would the ends of the Martin design need to be addressed, but likely the entire hose material would be required to be made of a material more tolerant of abrasives. Also, as has been pointed out, the central point of the Martin teaching is to provide an inner hose which presents a restriction to fluid flow to increase velocity. This works directly against Applicant's stated purpose of passing the cuttings through an inner tube which is of sufficient diameter to be easily able to pass cuttings in the returning fluid.

Likewise, combining Chapman's teaching with that of Willis and Martin would be illogical. Chapman's bit and circulation flow obviously allows large cuttings to enter the inner tube. The Martin teaching would not allow large cuttings to pass because of the inner hose presents a restriction which necessarily restricts the size of the fluid particles. Conventional drilling mud consists of very fine particles of clays, soaps, bentonite, etc. These size particles would likely pass Martin's internal restriction, but the cuttings from Chapman containing such larger sized particles

conceivably cannot. Also the cuttings would likely abrade Martin's hose material, since it is not intended to be abrasive resistant to the cuttings that would pass through it, traveling in the opposite direction from that intended and at a very high velocity.

C. The Rejection Of Claims 3, 17 and 18 Based Upon The Combination Of Garrett, Martin and Chapman:

The Examiner also used the same combination of Willis in view of Martin and Chapman '878 in rejecting Applicant's Claims 3, 17 and 18. Chapman is cited to show a "dual concentric drill string with a connector sub and a bit at the lower end that is attached to a drill string for reverse circulation drilling" (Office Action, paragraph 7). Basically, the same line of argument previously advanced applies to this grounds of rejection. Note that Applicant's independent method Claim 17 has been amended to emphasize the dual flow nature of Applicant's device and the unrestricted inner tube diameter. To briefly recap the argument, the Martin hose would not work well in reverse circulation applications. Reverse circulation does not work very well with restrictions in the inner tube. Cuttings will pile up and clog the inner tube. Drilling would likely need to cease, because there is no place for the cuttings to go. The drill pipe would likely be stuck in the hole because eventually the cuttings would come up the annulus between the pipe and the hole being drilled, following a path of least resistance, creating a binding effect.

The Martin reference did not teach that the flow of cutting was intended to flow to the surface through the inner hose. The intent of the patent was conventional circulation drilling with the drilling fluid being pumped from the well surface down the center of the inner tube to the drill bit with the cuttings being flushed back to the surface of the borehole up the annulus between the outer wall of the drill pipe and the well bore wall.

D. The Rejection Of Claims 5-10 Based Upon Garrett In View of Martin And Further In View Of Terry:

The Examiner rejected Applicant's Claims 5-10 under 35 U.S.C.§103(a) based upon the above combination of art. These dependent claims basically describe the feature of the invention in which Applicant's inner tube includes a conductive element for conveying a signal and/or electricity. The Garrett and Martin references have previously been discussed at length. The Terry reference is cited by the Examiner to add the teaching of "a composite material tubular that encloses a number of communication lines within, including fiber optic, copper lines and metallic meshes" (Office Action,

paragraph 8). Applicant would respectfully submit that these claims, being dependent upon independent Claim 1, should be allowable for the same reasons as independent Claim 1 previously advanced.

Additionally, while the Terry reference describes a coiled composite tubing with communication and/or electrical wiring within the wall of the tubing, the tubing is not used for reverse circulation. It lacks an inner tube to furnish an avenue for cuttings removal. Specialized tools are mounted on the coil tubing to drill the hole or cut through existing casing. It is possible that Martin's material could accommodate Terry's electronic hardware, since Martin's restrictor would furnish a thick enough wall for the electronic hardware. However, the cuttings would not be able to pass through the inside diameter of Martin's hose material. Also it would likely be difficult to encase the electronics into Martin's material.

E. The Rejection Of Claims 5-10 and 19 Based Upon Willis, Martin, Chapman and Terry:

The Examiner has rejected Applicant's Claims 5-10 and 19 based upon the above art. Terry is added to show an inner tubular which encloses communication lines, etc. as previously discussed. Chapman is cited to show a reverse circulation flow. Applicant would again submit that these dependent claims should be allowed based upon the allowability of the parent independent claim.

Additionally, the cited combination of diverse art simply is not practical. The Martin teaching uses high velocities/ low volume drilling mud. The Terry reference uses conventional low velocity / high volume drilling mud. Chapman and Willis use high volume / medium velocity air. Chapman and Willis are using reverse circulation. Martin uses conventional oil field drilling techniques with the inside diameter of the tube conveying drilling fluid to down hole tools. The fluid returns between the bore hole or casing, delivering the cuttings buoyantly up the hole at low velocity. Mixing and matching these opposing theories of operation is a major jigsaw puzzle. Mixing and matching these theories would end up with hundreds of configurations and variables facing the designer.

F. The Rejection Of Claim 19 Based Upon Garrett In View Of Martin, Chapman and Terry:

This rejection basically repeats the same arguments previously addressed but adds a teaching of drilling in a substantially vertical path. Applicant's invention does not reside in the particular type of path being drilled. However, as pointed out at length in the earlier argument, it is the particular structural arrangement of parts and materials which allows Applicant's device to drill even highly

deviated bore holes.

G. The Rejection of Claim 20 Based Upon Garrett of Willis In View Of Martin, Chapman and Cherrington:

Applicant's argument from paragraph F above applies to this combination of references, as well. The newly cited Cherrington reference merely describes a horizontal drilling operation with a wash over pipe and conventional drill pipe. The inner conventional drill pipe is not connected to the outer wash pipe/casing in any manner. The addition of a teaching of a particular orientation of drilling would still not arrive at the features of Applicant's independent claim from which Claim 20 depends.

IV. Conclusion:

Based upon the above arguments and amendments, Claims 1-20 are thought to be allowable over the art of record and an early notification of the same would be appreciated.

Respectfully submitted,

Date: Oct 19, 2005

Charles D. Gunter, Jr.
Reg. No. 29,386
Whitaker, Chalk, Swindle & Sawyer, LLP
301 Commerce St., Suite 3500
Fort Worth, Texas 76102
(817) 878-0504

ATTORNEY(S) FOR APPLICANT